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POSTAL RATE AND FEE CHANGES, 1997

Docket No. R97-1

RESPONSE OF UNITED STATES POSTAL SERVICE
WITNESS TAKIS TO INTERROGATORIES OF
UNITED PARCEL SERVICE
(UPS/USPS-T41-15-24)

The United States Postal Service hereby provides responses of witness Takis to the following interrogatories of United Parcel Service: UPS/USPS-T41-15-24, filed on September 12, 1997.

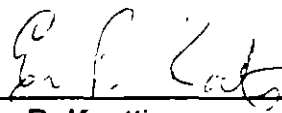
Each interrogatory is stated verbatim and is followed by the response.

Respectfully submitted,

UNITED STATES POSTAL SERVICE

By its attorneys:

Daniel J. Foucheaux, Jr.
Chief Counsel, Ratemaking


Eric P. Koetting

475 L'Enfant Plaza West, S.W.
Washington, D.C. 20260-1137
(202) 268-2992; Fax -5402
September 26, 1997

**RESPONSE OF UNITED STATES POSTAL SERVICE WITNESS TAKIS
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UPS/USPS-T41-15. Please describe your procedure for generating the piggyback figures. Include the following in your response:

- a) An explanation of how you assign dependent components to independent components. If you have a table of dependencies, please provide it.
- b) An explanation of how you distribute a dependent component among several independent cost components.

UPS/USPS-T41-15 Response:

Parts (a) and (b): My workpapers contain an overview of my treatment of dependent components, including the development of piggyback factors. Please see pages II-20 through II-23. Although I do not have a complete list of dependencies, LR-H-198, "Documentation of Piggyback Ratios Used in Incremental Cost Analysis", contains detailed calculations for the development of the piggyback factors used in my analysis.

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UPS/USPS-T41-16. Please confirm that you assume that the dependent components have the same cost function as the independent components upon which they depend. If confirmed, please explain the theoretical basis for this assumption. For example, why should it be the case that the cost function for Supervision of Window Service (CS 2.2), has exactly the same functional form as Window Service Clerks (CS 3.2)?

UPS/USPS-T41-16 Response:

Not confirmed. The assumption I make, which has also been made by both the Postal Service and the Commission for years to develop volume variable costs, is that the volume variabilities of dependent components are equal to the volume variabilities of the independent components on which they depend. For a discussion of the theoretical basis for this assumption, please see Bradley, M.D., Colvin, J.L., and Smith, M.A., "Measuring Product Costs for Ratemaking: The United States Postal Service", in Regulation and the Nature of Postal and Delivery Services (Kluwer Academic Publishers; 1993). Please pay particular attention to Section 3.4, where the authors discuss the theoretical basis for this assumption.

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UPS/USPS-T41-17. Please confirm that wherever another Postal Service witness develops variability estimates using a functional form for a cost pool, you use the variability estimate and functional form of that witness in your calculation of incremental cost for that cost pool. If not confirmed, please list all the instances in which another witness used a particular functional form or variability estimate and you did not, and explain why you used a different functional form or variability estimate.

UPS/USPS-T41-17 Response:

Not confirmed. While I generally use both the variability estimates and functional forms developed by other Postal Service witnesses, there are cases where I only use their variability estimates. Each of these cases is described in my testimony and/or my workpapers. They include CS 3.2 Window Service (see my testimony, p. 16, lines 24 - 29, p. 17, lines 1- 5, and footnotes 9 and 10), CS 9.2 Special Delivery Messenger Street Activity, Special Purpose Routes and Motorized Letter Routes under CS 7, and Vehicle Service Drivers BMC non-spotter under CS 8 (see my workpapers, Section II-13).

In addition, because of the unique nature of "access" and "time at stop" activities, I do not use Witness Baron's (USPS-T-9) variability estimates or the functional forms used to generate them. I instead use the single subclass stop ratio method to estimate incremental costs for these activities, as I discuss in my workpapers (Section II-16).

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UPS/USPS-T41-18. Please refer to Section II-9 of your workpapers, at equation 12 and its explanatory text.

- a) Please confirm that wherever another Postal Service witness provides a variability estimate but not a functional form, you assume the constant elasticity functional form $C = D^{\beta}$.
- b) Please confirm that the assumption of constant elasticity is also the assumption of a functional form.
- c) Please explain why this particular functional form is appropriate.

UPS/USPS-T41-18 Response:

Part (a): Confirmed. However, I also use a constant elasticity functional form when the analytical approach used to develop variability estimates does not lend itself well to incremental cost analysis, as I discuss on pages 16 and 17 of my testimony. For example, please see footnote 10 in my testimony, where I discuss the variability estimates provided by Witness Brehm (USPS-T-21) in this Docket. While his estimates may be based on assumed functional forms, I cannot use those functional forms in my incremental cost analysis.

Part (b): I can neither confirm nor deny your statement, as I do not understand what it means.

Part (c): Please see footnote 9 on page 17 of my testimony. To expand on the justification for using a constant elasticity functional form presented there, the constant elasticity function has the benefit (as its name implies) of having the same elasticity for all values of the driver. Because I often am forced to use an elasticity estimates that have no specified functional form (as I discuss on pages 16 and 17 of my testimony and section II-C of my workpapers), I do not *a priori* know how the elasticity estimate I am provided should change with varying levels of the driver. My implicit use of the constant elasticity functional form in these cases fits well with the "constant elasticity" estimate I am provided.

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UPS/USPS-T41-19. Please confirm that all of the costs you use as inputs are developed by other witnesses in their testimony and work papers. If not confirmed, please explain which cost data you developed.

UPS/USPS-T41-19 Response:

Confirmed.

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UPS/USPS-T41-20. Please confirm that you did not develop any of the variabilities yourself. If not confirmed, please explain which variabilities you developed.

UPS/USPS-T41-20 Response:

Confirmed.

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UPS/USPS-T41-21. Please provide a mathematical derivation of the relationship for Inter-SCF highway marginal cost depicted in the diagram at the top of page 23 of your testimony.

- a) In reference to this example for a cost component with estimated variability of approximately 65.74 percent, please reconcile the statement at page 22 of your testimony that, "a deviation of 25 percent below the mean raises the marginal cost by only approximately 3 percent," with your statement at page 24 that, "a volume variability of 65 percent implies that removal of 10 percent of the driver increases marginal cost by only 3.5 percent."
- b) What is your estimate of the impact on the marginal cost of inter-SCF highway transportation of a 10 percent reduction in cubic foot miles? Please explain your estimate in detail, including the appropriateness of measuring variabilities and marginal costs points distinct from the mean values of the observations.

UPS/USPS-T41-21 Response:

Please see Attachment I (page 1) to this response, which provides the details of the calculations used to develop the diagram at the top of page 23 of my testimony.

Part (a): Your question is comparing apples and oranges.

The example in the diagram presented on page 23 of my testimony shows discrete changes in total accrued costs for different levels of the cost driver (i.e., cubic foot miles) for a specific component (i.e., Inter-SCF Highway Purchased Transportation) that uses a translog functional form for estimating both marginal (volume variable) and incremental costs. The diagram represents an *approximation* of changes in marginal costs given changes in the driver in this highly simplified approach. The statement from my testimony referenced in your question refers to a continuous mathematical relationship for a generic constant elasticity functional form with an assumed 65% variability estimate. There is no reason to believe *a priori* that the relationship between changes in marginal costs and changes in the cost driver will be the same for these two examples. Specifically:

- the variabilities are different in the two cases (as your question points out);

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- the translog example has second order terms that the constant elasticity example does not;
- the translog (Inter-SCF Highway) example is a discrete approximation of the relationship between marginal costs and the cost driver.

Part (b): Substituting the actual relationship between marginal costs and the driver for the discrete approximation described above, I estimate that marginal costs for Inter-SCF Highway Purchased transportation would decrease by approximately 2.48 percent given a 10 percent reduction in cubic foot miles from the mean value of cubic foot miles used to estimate the variability equations. This analysis is shown on page 2 of the accompanying Attachment I. This analysis assumes the following functional forms:

$$\ln(C) = \alpha_0 + \alpha_1 \ln(D) + \alpha_2 [\ln(D)]^2$$

$$\frac{\partial C}{\partial D} = [e^{\alpha_0 + \alpha_1 \ln(D) + \alpha_2 [\ln(D)]^2}] * \left[\frac{\alpha_1 + 2\alpha_2 \ln(D)}{D} \right]$$

where C = accrued costs for component
D = mean-centered driver level for component
 $\alpha_0, \alpha_1, \alpha_2$ = parameter estimates

Furthermore, it is my understanding that this analysis of changes in marginal costs and driver levels from mean levels is entirely consistent with the approach Dr. Bradley used in developing his volume variability estimates for both purchased transportation and mail processing labor (USPS-T-13 and USPS-T-14), as he used mean-centered data.

inter-SCF Highway (Discrete Analysis)

Change in Marginal Cost Away from Mean

Attachment to UPS/USPS-T41-21 (page 1)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Mean CFM (Dbar)	% change in CFM away from Mean CFM	"New" CFM (D)	Cost	MC	"Mean" MC"	% change in MC as % of Mean
100	75.0%	75	55959.4983	1138.34737	1104.77855	1.03038698
100	77.5%	77.5	57093.4934	1133.99508	1104.77855	1.02844747
100	80.0%	80	58223.4032	1129.90983	1104.77855	1.02274966
100	82.5%	82.5	59349.4748	1126.07133	1104.77855	1.01827519
100	85.0%	85	60471.9359	1122.4613	1104.77855	1.01800754
100	87.5%	87.5	61590.9991	1119.08327	1104.77855	1.01293178
100	90.0%	90	62708.8615	1115.88234	1104.77855	1.01003442
100	92.5%	92.5	63819.7064	1112.84497	1104.77855	1.00730322
100	95.0%	95	64929.7053	1109.99888	1104.77855	1.00472703
100	97.5%	97.5	66037.0181	1107.3128	1104.77855	1.00229572
100	100.0%	100	67141.7948	1104.77855	1104.77855	1
100	102.5%	102.5	68244.1753	1102.39071	1104.77855	0.99783138
100	105.0%	105	69344.292	1100.11668	1104.77855	0.99578208
100	107.5%	107.5	70442.2886	1097.97658	1104.77855	0.99384492
100	110.0%	110	71538.2218	1095.95305	1104.77855	0.99201332
100	112.5%	112.5	72632.2811	1094.03943	1104.77855	0.99028119
100	115.0%	115	73724.4906	1092.2295	1104.77855	0.98864291
100	117.5%	117.5	74815.0081	1090.51749	1104.77855	0.98709327
100	120.0%	120	75903.9082	1088.89809	1104.77855	0.98562745
100	122.5%	122.5	76991.2725	1087.38834	1104.77855	0.98424097
100	125.0%	125	78077.1901	1085.91783	1104.77855	0.98292966

α_0	11.114582
α_1	0.857448
α_2	0.084087

(1) Average CFM across all inter-SCF Highway routes. Constant across all cases therefore using assumed = 100 rather than real amount.

(2) Range of possible increases or decreases in volume - 75% - 125%

(3) Mean CFM (Column (1)) * % Change in CFM away from Mean CFM (Column (2))

(4) $C = e^{11.114582 + 0.857448 \ln(D/Dbar) + 0.084087 \ln(D/Dbar)^2}$

(5) MC = difference in C from one increment to the next

(6) Mean MC = MC at 100% of CFM

(7) "New" MC (Column (5))/"Mean" MC (Column (6))

Inter-SCF Highway (Continuous Analysis)

Change in Marginal Cost Away from Mean

Attachment to UPS/USPS-T41-21 (page 2)

(1)	(2)	(3)	(4)	(5)	(6)
Mean CFM (Dbar)	% change in CFM away from Mean CFM	"New" CFM (D)	"New" MC	"Mean" MC"	% change in MC as % of Mean
100	90%	90	764746.878	746251.639	1.024783915
100	100%	100	746251.639	746251.639	1

α_0 11.114562

α_1 0.857448

α_2 0.064067

- (1) Average CFM across all Inter-SCF Highway routes. Constant across all cases therefore using assumed = 100 rather than real amount.
- (2) Range of possible increases or decreases in volume -- 75% - 125%
- (3) Mean CFM (Column (1)) * % Change in CFM away from Mean CFM (Column (2))
- (4) See functional relationship for marginal cost described in text of response
- (5) Mean MC = MC when CFM are at Mean (100% in Column (2))
- (6) "New" MC (Column (4))/"Mean" MC (Column (5))

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UPS/USPS-T41-22. In reference to your testimony at page 8, please document the Postal Service's operating plan for purchased highway transportation in terms of procedure, policies, instructions, manuals, and all other management guidance applied in establishing routes, vehicle capacities, trips and trip frequencies, and other operating procedures used in management of this function.

UPS/USPS-T41-22 Response:

My use of the concept "operating plan" in my testimony is based on my understanding of Dr. Panzar's (USPS-T-11) use of the term. It is my understanding that the term is not intended to imply that there necessarily exists some written document or set of documents which are composed by the Postal Service as a "plan" for performing a given function.

As I am not testifying as an expert in transportation operations, I am not able to provide the materials you have requested.

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UPS/USPS-T41-23.

- a) Please list all Postal Rate Commission decisions which you read, either in whole or in part, before you prepared your testimony.
- b) In those instances where you have read only part of a Commission decision, please identify those portions of each such decision which you read before you prepared your testimony.

UPS/USPS-T41-23 Response:

Parts (a) and (b): I have read portions of Commission decisions in each of the Postal Services' Omnibus Rate Filings dating back to R84-1 and several of the Mail Classification decisions over the past 15 years. As I have read these decisions in a variety of contexts over the past eleven years that I have been working on postal projects, it is impossible for me to recount at this time each and every portion of individual decisions that I may have read.

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UPS/USPS-T41-24. Identify all sections of the Postal Reorganization Act which you read in connection with the preparation of your testimony.

UPS/USPS-T41-24 Response:

I did not read any of the Postal Reorganization Act in connection with the preparation of my testimony in this Docket.

DECLARATION

I, William M. Takis, declare under penalty of perjury that the foregoing answers are true and correct, to the best of my knowledge, information, and belief.

W. M. Takis

Dated: 9-26-97

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon all participants of record in this proceeding in accordance with section 12 of the Rules of Practice.



Eric P. Koetting

475 L'Enfant Plaza West, S.W.
Washington, D.C. 20260-1137
September 26, 1997